Final

Site Investigation Report

Former Range 43, Parcel 97Q;
Range, Choccolocco Corridor, Parcel 144Q-X; and
Impact Area, Choccolocco Corridor, Parcel 147Q-X

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

Shaw Environmental, Inc.
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK10
Contract No. DACA21-96-D-0018
Shaw Project No. 796887

April 2004

Revision 0

Table of Contents

Page

Table of Contents (Continued)

Page

List of Appendices

List of Tables

List of Figures

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, Shaw Environmental, Inc. completed a site investigation (SI) at Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Choccolocco Corridor, Parcel 147Q-X, at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site as a result of historical mission-related Army activities. The SI consisted of the collection and analysis of 25 surface and depositional soil samples, 18 subsurface soil samples, and 1 groundwater sample. In addition, three groundwater monitoring wells were installed during the SI; however, two of the wells did not produce sufficient water for sampling.

Chemical analysis of samples collected at the site indicates that metals, volatile organic compounds (VOC), pesticides, two herbicides, and one explosive compound were detected in site media. Semivolatile organic compounds were not detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

Constituents detected at concentrations exceeding SSSLs and background (where available) were identified as chemicals of potential concern (COPC) in site media. COPCs included eight metals in surface soil and six metals in subsurface soil. The most significant COPC is lead, which was detected at concentrations exceeding its residential SSSL in six surface soil samples. VOC, pesticide, herbicide, and explosive compound concentrations in site media were all below SSSLs.

Constituents detected at concentrations exceeding ESVs and background (where available) were identified as constituents of potential ecological concern (COPEC) in surface soil. COPECs included 13 metals, eight pesticides, and one herbicide. VOC and explosive compound concentrations in site media were below ESVs.

Based on the results of the SI, past operations at Parcels 97Q, 144Q-X, and 147Q-X have impacted the environment. Therefore, Shaw Environmental, Inc. recommends that a remedial investigation be conducted to determine the extent of contamination in soil at Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Choccolocco Corridor, Parcel 147Q-X.

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted Shaw Environmental, Inc. (Shaw) (formerly IT Corporation [IT]) to perform the site investigation (SI) at Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Choccolocco Corridor, Parcel 147Q-X, under Contract Number DACA21-96-D-0018, Task Order CK10.

This report presents specific information and results compiled from the SI, including field sampling and analysis and monitoring well installation activities, conducted at Parcels 97Q, 144Q-X, and 147Q-X.

1.1 Project Description

Parcels 97Q, 144Q-X, and 147Q-X were identified as areas to be investigated prior to property transfer. The sites were classified as Category 1 Qualified parcels in the *Final Environmental Baseline Survey, Fort McClellan, Alabama* (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 1 Qualified parcels are areas that have no evidence of storage, release, or disposal of petroleum products or hazardous substances regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) but that do have other environmental or safety concerns. Parcels 97Q, 144Q-X, and 147Q-X were qualified because chemicals of potential concern and/or unexploded ordnance (UXO) may be present as a result of historical range activities.

A site-specific work plan, comprised of a field sampling plan (SFSP), a safety and health plan, and a UXO safety plan, was finalized in April 2002 (IT, 2002a). The work plan was prepared to provide technical guidance for SI field activities at Parcels 97Q, 144Q-X, and 147Q-X. The site-specific work plan was used as an attachment to the installation-wide work plan (IT, 1998) and

the installation-wide sampling and analysis plan (SAP) (IT, 2000a; IT, 2002b). The SAP includes the installation-wide safety and health plan and quality assurance plan.
The SI included fieldwork to collect 18 surface soil samples, 7 depositional soil samples, 18 subsurface soil samples, and 1 groundwater sample to determine whether potential site-specific chemicals are present at the site.

1.2 Purpose and Objectives

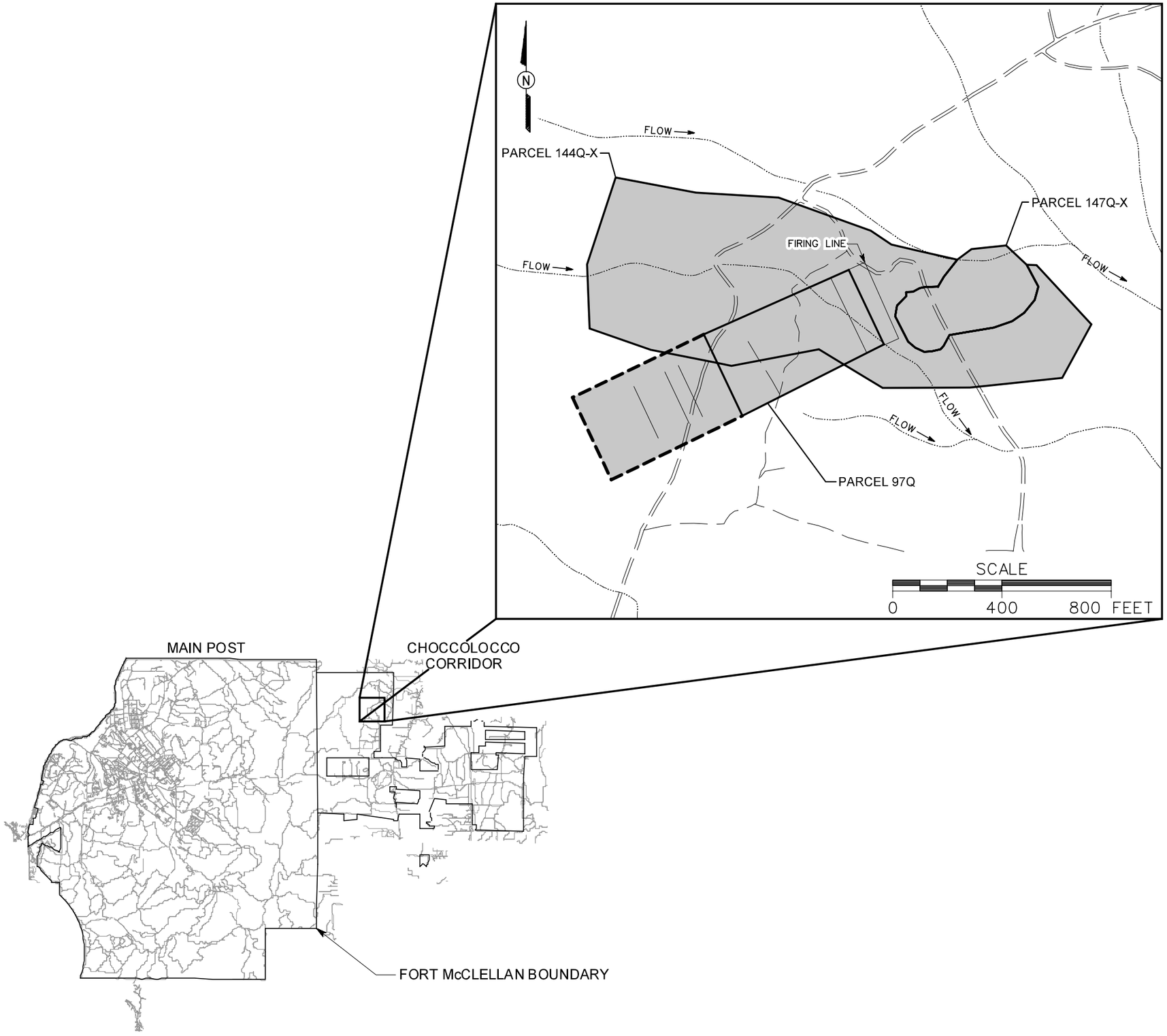
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Parcels 97Q, 144Q-X, and 147Q-X at concentrations that pose an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by Shaw as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation, 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide either to propose "No Further Action" or to conduct additional work at the site.

1.3 Site Description and History

Parcels 97Q, 144Q-X, and 147Q-X are located west of the Choccolocco Mountains, approximately one mile east of the eastern boundary of the FTMC Main Post. The parcels are located in the northwestern area of the Choccolocco Corridor (Figure 1-1).

In 1941, the Alabama legislature leased approximately 4,488 acres to the U.S. government to provide an access corridor from the Main Post to Talladega National Forest. The lease for Choccolocco Corridor was terminated in May 1998, and the land is now managed by the Alabama Forestry Commission.



LEGEND

- UNIMPROVED ROADS
- PARCEL BOUNDARY / AREA OF INVESTIGATION
- AREA OF ADDITIONAL INVESTIGATION
- SURFACE DRAINAGE

FIGURE 1-1
SITE LOCATION MAP
FORMER RANGE 43, PARCEL 97Q;
RANGE, CHOCCOLOCCO CORRIDOR;
PARCEL 144Q-X; AND
IMPACT AREA, CHOCCOLOCCO
CORRIDOR, PARCEL 147Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

DWG. NO.: ...\796887es.655 | PROJ. NO.: 796887
INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 02/06/03 | DRAWN BY: D. BOMAR
4/13/2004 3:09:19 PM
lstout c:\cadd\Design\796887es.655

The information presented for each of the subject parcels was compiled from the EBS (ESE, 1998), the *Archives Search Report, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 2001a), and site walks conducted by Shaw personnel in December 2001 and January 2002.

Parcel 97Q. Former Range 43, Parcel 97Q, is identified as a former small-arms range. The area of investigation for Parcel 97Q was expanded beyond the EBS parcel boundary based upon the results of the site walk and a review of aerial photographs. The area of investigation for Parcel 97Q covers approximately 8.3 acres.

The Parcel 97Q range was previously designated as Range 43 and Range 3, but the dimensions of these previous ranges are not documented in the EBS. Interviews with long-time FTMC personnel indicated that the Parcel 97Q range was used for small-arms weapons training during the Korean War and the Vietnam War. The direction of fire was reportedly to the west; however, the firing line identified for this range in the EBS suggests a southwesterly fire direction. Evidence of smoke training has also been observed in the vicinity of this former range (ESE, 1998).

SI site walks conducted at Parcel 97Q revealed several features that appear to be related to range training activities (Figure 1-2). These features include the following:

- A line of firing positions or target pits spaced at approximately 20-foot intervals was observed just east of Parcel 97Q. The approximate dimensions were two feet by three feet and six feet deep. The walls were supported by wooden framework. These features are presumed to have been used as firing positions or target pits. The location of these features appears to be east of the Parcel 97Q firing line.

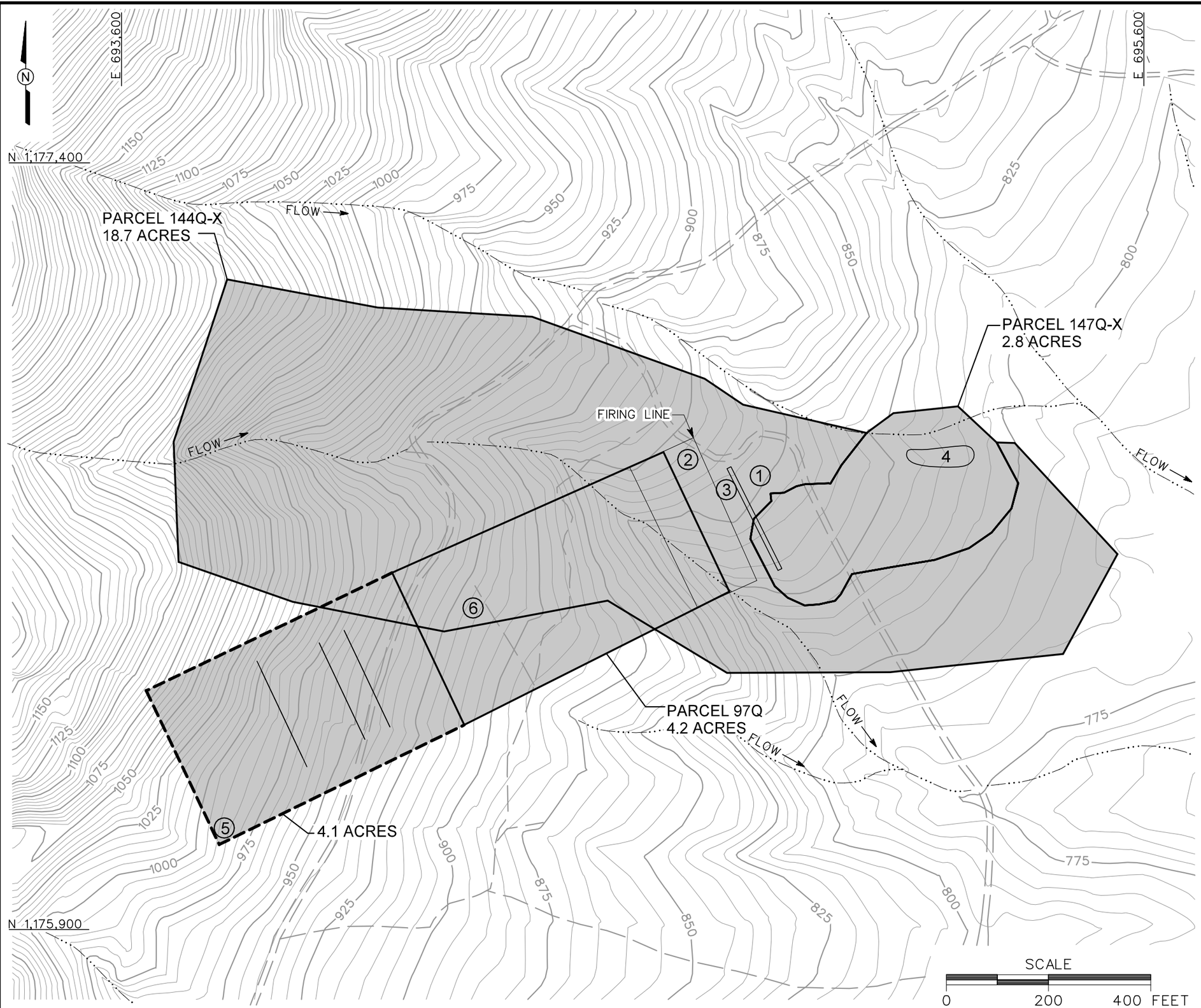
- Numerous 5.56-millimeter (mm) blanks were observed near an old road in the western portion of Parcel 97Q.

- Numerous wood-framed target boxes were observed in the hillside southwest of the Parcel 97Q boundary identified in the EBS. The target boxes were oriented in several northwest/southeast-trending lines.

- An end-of-range sign was located approximately 500 feet southwest of the western boundary of Parcel 97Q.

Parcel 144Q-X. Range, Choccolocco Corridor, Parcel 144Q-X, approximately 18.7 acres in size, was identified as a former range. Parcel 144Q-X encompasses about two thirds of Parcel 97Q and most of Parcel 147Q-X. The presence of cratered impact areas within the range area

DWG. NO.: ...\796887es.656 | PROJ. NO.: 796887
INITIATOR: M. MALONEY | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 01/16/02 | DRAWN BY: D. BOMAR
4/13/2004 3:44:51 PM lstout
c:\cadd\Design\796887es.656



LEGEND

- UNIMPROVED ROADS
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- PARCEL BOUNDARY / AREA OF INVESTIGATION
- AREA OF ADDITIONAL INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE
- WOOD-FRAMED TARGET BOXES ON HILLSIDE

APPROXIMATE LOCATION OF OBSERVED FEATURES

1. OBSERVATION TOWER
2. AIRFRAME MOCK-UP
3. WOOD-FRAMED FIRING/TARGET POSITIONS
4. DEPRESSIONS WITH AMMUNITION BOXES, 40mm FLARE AND POP FLARE EXPENDED
5. END-OF-RANGE SIGN
6. NUMEROUS 5.56mm BLANKS; POSSIBLE FIRING POSITION

SCALE
0 200 400 FEET

FIGURE 1-2
SITE MAP
FORMER RANGE 43, PARCEL 97Q; RANGE, CHOCCOLOCCO CORRIDOR; PARCEL 144Q-X; AND IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 147Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

suggests that large-caliber weapons may have been fired toward Parcel 144Q-X (ESE, 1998). Fused ordnance may be present at this site. This range appears to be active in Environmental Photographic Interpretation Center aerial photographs taken in 1949, 1954, and 1972 (ESE, 1998).

SI site walks conducted at Parcel 144Q-X revealed the presence of several possible range-related features within the boundary of Parcel 144Q-X. The locations of the observed features are shown on Figure 1-2 and included:

- An observation tower located in the east-central portion of the parcel.
- An airframe mock-up located in the north-central portion of Parcel 144Q-X. The airframe was not used for target practice.
- A series of firing positions or target pits located east of Parcel 97Q (described above in the Parcel 97Q description).
- An area of depressions located in the northeastern area of Parcel 147Q-X. The depressions were approximately 3 to 6 feet wide by 2 feet deep. An ammunition box was present in the bottom of one depression. An expended 40-mm flare and an expended pop flare were present near the depressions. It is speculated that these depressions were used as foxholes for firing positions.

Parcel 147Q-X. Impact Area, Choccolocco Corridor, Parcel 147Q-X is approximately 2.8 acres in size and was identified as a former impact area. It is not known which range was associated with this impact area. This parcel is located within the boundaries of Parcel 144Q-X. Fused ordnance may be present at this site (ESE, 1998).

The Parcel 147Q-X site walk, conducted in December 2001, revealed an area of depressions approximately 3 to 6 feet wide and 2 feet deep in the northeastern area of Parcel 147Q-X. An ammunition box was present in the bottom of one depression. An expended 40-mm flare and an expended pop flare were present near the depressions. It is speculated that these depressions were used as firing points. The locations of these depressions are illustrated in Figure 1-2.

1.3.1 Archives Search Report Ranges

The ASR maps (USACE, 2001a) were examined to determine whether there were documented ranges present within the boundaries of Parcels 97Q, 144Q-X, and 147Q-X. The only range activity documented on the ASR maps was on Plate 6. Parcel 97Q is identified on Plate 6 as Range 43.

Plate 6 of the ASR. Plate 6 of the ASR, which covers the timeframe from 1950 until 1973, depicts a small-arms range in the same location and of similar dimensions as Parcel 97Q. The ASR lists this range as Range 43, "Technique of Fire Range." Range 43, which covered approximately 7 acres, was built during the Vietnam War and was abandoned by 1974.

1.3.2 Aerial Photographs

Available FTMC aerial photographs were reviewed to reveal any land-use activity at Parcels 97Q, 144Q-X, and 147Q-X, as summarized in the following paragraphs.

1937 and 1940. The 1937 and 1940 aerial photographs do not show any evidence of activity at the site. The parcels and the surrounding areas are forested. A dirt road is visible on the southwestern perimeter of Parcel 144Q-X.

1954. Signs of activity are visible in this aerial photograph (Figure 1-3). The northern portion of Parcel 97Q has been cleared. A dirt road is visible in the western portion of Parcel 144Q-X. Parcel 147Q-X is completely cleared. Some depressions are visible in the eastern half of Parcel 144Q-X.

1969. Land-use activity is evident within Parcel 97Q in this photograph (Figure 1-4). The cleared area extends beyond the boundary of Parcel 97Q to the southwest. The area of investigation for Parcel 97Q was expanded to include this additional area identified on the 1969 photograph. A road has been constructed leading to the firing line of Parcel 97Q. Much of Parcels 144Q-X and 147Q-X have been reforested. The observation tower is visible approximately 100 feet northeast of the Parcel 97Q firing line.

1976, 1982, 1994, and 1998. These photographs show an increase in ground vegetation and tree cover over time. The dirt roads have become less visible. Evidence of site activity is not apparent.

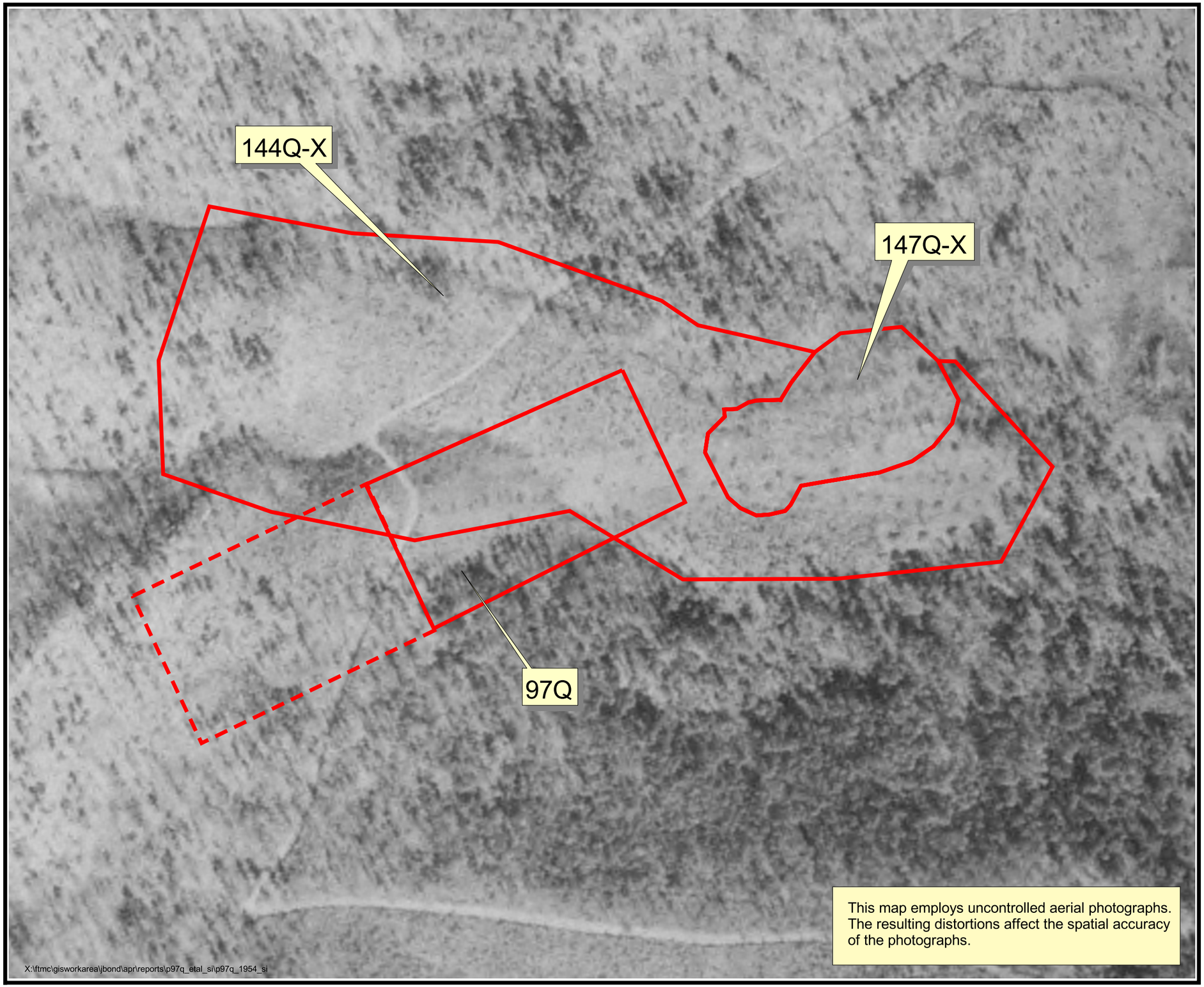


Figure 1-3

1954 Aerial Photograph

Parcels 97Q, 144Q-X, and 147Q-X, Fort McClellan, Alabama

Legend

- Area of Investigation/ Parcel Boundary
- Additional Area of Investigation

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

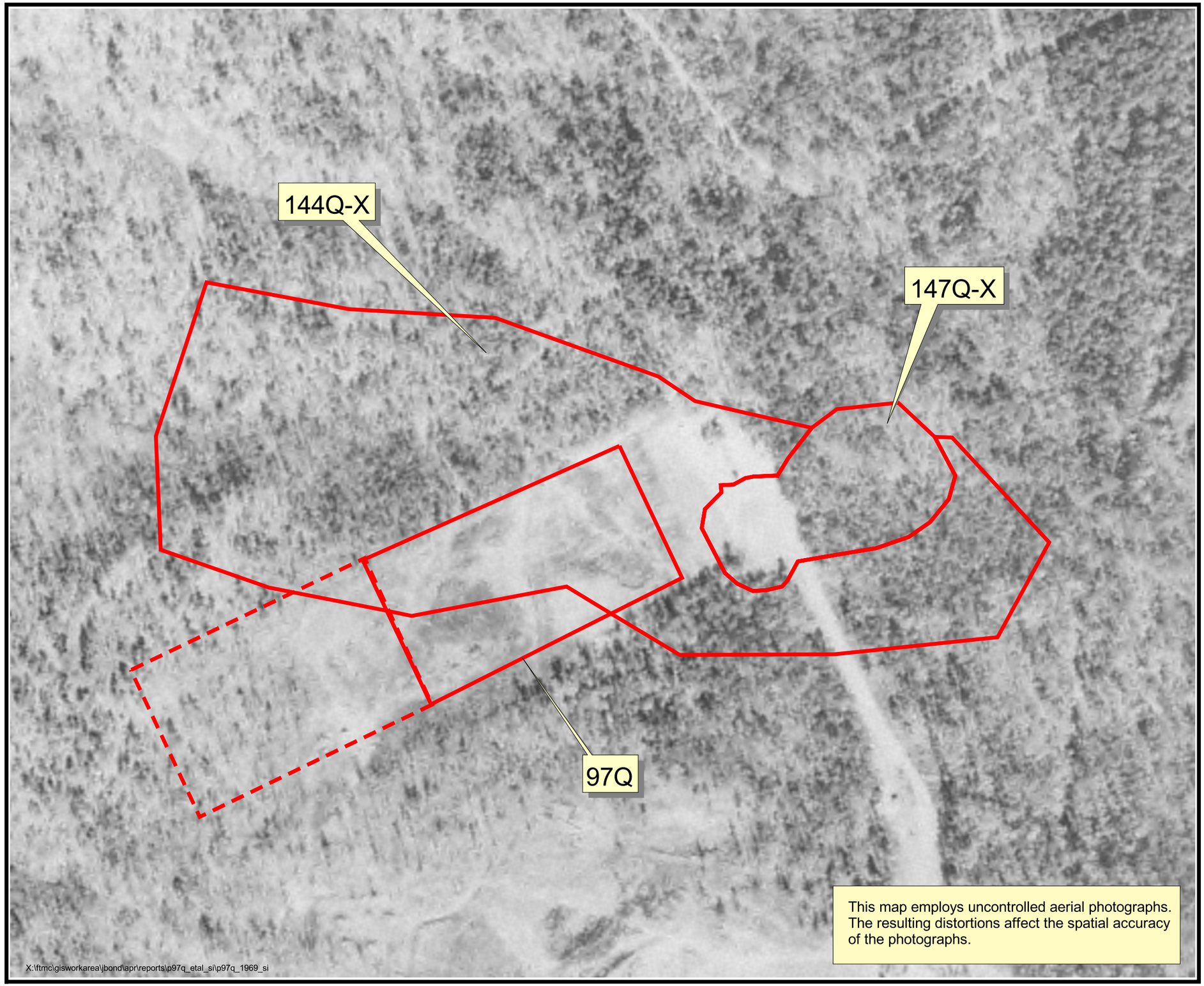


Figure 1-4

1969 Aerial Photograph

Parcels 97Q, 144Q-X,
and 147Q-X,
Fort McClellan, Alabama

Legend

- Area of Investigation/ Parcel Boundary
- Additional Area of Investigation

200 0 200 Feet

NAD83 State Plane Coordinates

N

Shaw™ Shaw Environmental, Inc.

U.S. Army Corps of Engineers Mobile District

Contract No. DACA21-96-D-0018

2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The purpose of the study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).

2. Areas where only release or disposal of petroleum products has occurred.

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken.

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented.

7. Areas that are not evaluated or require additional evaluation.

For non-CERCLA environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number; the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified parcel; and the code of the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues

- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with CERFA protocols (Public Law 102-426) and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA) Region 4, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Parcels 97Q, 144Q-X, and 147Q-X are areas where no known or recorded storage, release, or disposal (including migration) of hazardous substances or petroleum products has occurred on site property. The parcels, however, were qualified because chemicals of potential concern and/or UXO may be present as a result of historical range activities. Therefore, these parcels required additional evaluation to determine their environmental condition.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by Shaw at Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Choccolocco Corridor, Parcel 147Q-X, including UXO avoidance activities, environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 UXO Avoidance

UXO avoidance was performed at Parcels 97Q, 144Q-X, and 147Q-X following methodology outlined in the SAP. Shaw UXO personnel used a low-sensitivity magnetometer to perform a surface sweep of the area of investigation prior to site access. After the site was cleared for access, sample locations were monitored by UXO personnel following procedures outlined in the SAP.

3.2 Environmental Sampling

Environmental sampling performed during the SI at Parcels 97Q, 144Q-X, and 147Q-X included the collection of surface and depositional soil samples, subsurface soil samples, and groundwater samples for chemical analysis. Sample locations were determined by observing site physical characteristics during a site walk and by reviewing documents and aerial photographs pertaining to historical site activities. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analysis of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from 18 locations and depositional soil samples were collected from 7 locations at Parcels 97Q, 144Q-X, and 147Q-X, as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and analytical parameters are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Surface soil samples were collected from the uppermost foot of soil using a stainless-steel hand auger, following the methodology specified in the SAP. The depositional soil samples were collected from the uppermost foot of soil with a stainless-steel spoon. Surface and depositional soil samples were collected by first removing surface debris (e.g., rocks and

Table 3-1

Sampling Locations and Rationale
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-97Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near one of the wood-framed target boxes located downrange of the firing line near an area visible in the 1969 aerial photograph. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near one of the wood-framed target boxes located downrange of the firing line near a cleared area visible in the 1969 aerial photograph. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP03	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near one of the wood-framed target boxes located downrange of the firing line near a cleared area visible in the 1969 aerial photograph. The samples were collected to determine if site-specific chemicals have impacted site media.
HR-97Q-GP04	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near one of the wood-framed target boxes located downrange of the firing line near a cleared area visible in the 1969 aerial photograph. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP05	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near one of the wood-framed target boxes located downrange of the firing line near a cleared area visible in the 1969 aerial photograph. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP06	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the north-central portion of Parcel 97Q where numerous 5.56 mm rifle blanks were observed. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP07	Surface soil and subsurface soil	Surface and subsurface soil samples were collected approximately 50 feet south of Parcel 97Q at an overgrown road where numerous 5.56-mm rifle blanks were observed. Samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP08	Surface soil and subsurface soil	Surface and subsurface soil samples were collected approximately 300 feet downrange of the firing line for Parcel 97Q. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-GP09	Surface soil and subsurface soil	Surface and subsurface soil samples were collected at the firing line for Parcel 97Q. The samples were collected to determine if potential site-specific chemicals have impacted site media.

Table 3-2

Soil Sample Designations and Analytical Parameters
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-97Q-GP01	HR-97Q-GP01-SS-QL0001-REG	0-1		HR-97Q-GP01-SS-QL0001-MS/MSD	Metals and Explosives
	HR-97Q-GP01-DS-QL0002-REG	1.5-2.5			
HR-97Q-GP02	HR-97Q-GP02-SS-QL0003-REG	0-1			Metals and Explosives
	HR-97Q-GP02-DS-QL0004-REG	1-2			
HR-97Q-GP03	HR-97Q-GP03-SS-QL0005-REG	0-1			Metals and Explosives
	HR-97Q-GP03-DS-QL0006-REG	2.5-3.5			
HR-97Q-GP04	HR-97Q-GP04-SS-QL0007-REG	0-1			Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
	HR-97Q-GP04-DS-QL0008-REG	2-3	HR-97Q-GP04-DS-QL0009-FD		
HR-97Q-GP05	HR-97Q-GP05-SS-QL0010-REG	0-1			Metals and Explosives
	HR-97Q-GP05-DS-QL0011-REG	2.5-3.5			
HR-97Q-GP06	HR-97Q-GP06-SS-QL0012-REG	0-1			Metals and Explosives
	HR-97Q-GP06-DS-QL0013-REG	1-2			
HR-97Q-GP07	HR-97Q-GP07-SS-QL0014-REG	0-1			Metals and Explosives
	HR-97Q-GP07-DS-QL0015-REG	2-3			
HR-97Q-GP08	HR-97Q-GP08-SS-QL0016-REG	0-1			Metals and Explosives
	HR-97Q-GP08-DS-QL0017-REG	1-2			
HR-97Q-GP09	HR-97Q-GP09-SS-QL0018-REG	0-1			Metals and Explosives
	HR-97Q-GP09-DS-QL0019-REG	1-2			
HR-97Q-MW01	HR-97Q-MW01-SS-QL0020-REG	0-1	HR-97Q-MW01-SS-QL0021-FD		Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
	HR-97Q-MW01-DS-QL0022-REG	1.5-2.5			
HR-97Q-DEP01	HR-97Q-DEP01-DEP-QL0023-REG	0-1			Metals and Explosives
HR-144Q-GP01	HR-144Q-GP01-SS-QM0001-REG	0-1		HR-144Q-GP01-SS-QM0001-MS/MSD	TAL Metals and Explosives.
	HR-144Q-GP01-DS-QM0002-REG	2-3			
HR-144Q-GP02	HR-144Q-GP02-SS-QM0003-REG	0-1			Metals and Explosives
	HR-144Q-GP02-DS-QM0004-REG	2-2.5			
HR-144Q-GP03	HR-144Q-GP03-SS-QM0005-REG	0-1			Metals and Explosives
	HR-144Q-GP03-DS-QM0006-REG	1-2			
HR-144Q-GP04	HR-144Q-GP04-SS-QM0007-REG	0-1			Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
	HR-144Q-GP04-DS-QM0008-REG	1.5-2	HR-144Q-GP04-DS-QM0009-FD		
HR-144Q-MW01	HR-144Q-MW01-SS-QM0010-REG	0-1			Metals and Explosives
	HR-144Q-MW01-DS-QM0011-REG	1-2			
HR-144Q-DEP01	HR-144Q-DEP01-DEP-QM0012-REG	0-1			Metals and Explosives
HR-144Q-DEP02	HR-144Q-DEP02-DEP-QM0013-REG	0-1	HR-144Q-DEP02-DEP-QM0014-FD		Metals and Explosives

Table 3-1

Sampling Locations and Rationale
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-97Q-MW01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near a cleared area visible in the 1969 aerial photograph, downslope of numerous wooden-framed target boxes. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-97Q-DEP01	Depositional soil	A depositional soil sample was collected from an intermittent streambed that crosses the firing line in the eastern portion of Parcel 97Q to determine if potential site-specific chemicals have impacted site media.
HR-144Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the western area of Parcel 144Q-X near a cleared area in the 1954 aerial photograph. The samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-144Q-GP02	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the western area of Parcel 144Q-X, near a cleared area in the 1954 aerial photograph. Samples were collected to determine if potential site-specific chemicals have impacted site media.
HR-144Q-GP03	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the east-central area of Parcel 144Q-X, near a series of rectangular firing positions or target pits. Samples were collected to determine if potential site-specific chemicals have impacted site-media.
HR-144Q-GP04	Surface soil and subsurface soil	Surface and subsurface soil samples were collected near the eastern boundary of Parcel 144Q-X, near a cleared area in the 1954 aerial photograph. Samples were collected to determine if site-specific chemicals have impacted site media.
HR-144Q-MW01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the north-central portion of Parcel 144Q-X, near a cleared area in the 1954 aerial photograph. Samples were collected to determine if site-specific chemicals have impacted the site media.
HR-144Q-DEP01	Depositional soil	A depositional soil sample was collected from an intermittent streambed in the western portion of Parcel 144Q-X. The sample was collected to determine if site-specific chemicals have impacted site media.
HR-144Q-DEP02	Depositional soil	A depositional soil sample was collected from an intermittent streambed in the western portion of Parcel 144Q-X. The sample was collected to determine if site-specific chemicals have impacted site media.
HR-144Q-DEP03	Depositional soil	A depositional soil sample was collected from an intermittent streambed outside the northern boundary of Parcel 144Q-X to determine if potential site-specific chemicals have impacted site media.

Table 3-1

Sampling Locations and Rationale
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
HR-144Q-DEP04	Depositional soil	A depositional soil sample was collected from an intermittent streambed near the southern boundary of Parcel 144Q-X to determine if potential site-specific chemicals have impacted site media.
HR-147Q-GP01	Surface soil and subsurface soil	Surface and subsurface soil samples were collected in the southern portion of Parcel 147Q-X to determine if potential site-specific chemicals have impacted site media.
HR-147Q-MW01	Surface soil, subsurface soil	Surface and subsurface soil samples were collected downslope of a series of firing positions or target pits in the southwestern area of Parcel 147Q-X. The samples were collected to determine if potential site-specific chemicals have impacted site media. A residuum monitoring well was installed to determine local groundwater flow direction and location-specific geology.
HR-147Q-MW02	Surface soil, subsurface soil, and groundwater	Surface soil, subsurface soil, and groundwater samples were collected downslope of some depressions in the eastern portion of Parcel 147Q-X to determine if potential site-specific chemicals have impacted site media. A residuum monitoring well was also installed to determine local groundwater flow direction and location-specific geology.
HR-147Q-DEP01	Depositional soil	A depositional soil sample was collected from an intermittent streambed north of Parcel 147Q-X to determine if potential site-specific chemicals have impacted the site media.
HR-147Q-DEP02	Depositional soil	A depositional soil sample location was collected from an intermittent streambed northeast of Parcel 147Q-X to determine if potential site-specific chemicals have impacted site-media.

Table 3-2

Soil Sample Designations and Analytical Parameters
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Parameters
			Field Duplicates	MS/MSD	
HR-144Q-DEP03	HR-144Q-DEP03-DEP-QM0015-REG	0-1			Metals and Explosives
HR-144Q-DEP04	HR-144Q-DEP04-DEP-QM0016-REG	0-1	HR-144Q-DEP04-DEP-QM0017-FD		Metals, VOCs, SVOCs, Pesticides, Herbicides, and Explosives
HR-147Q-GP01	HR-147Q-GP01-SS-QN0001-REG	0-1		HR-147Q-GP01-SS-QN0001-MS/MSD	Metals and Explosives
	HR-147Q-GP01-DS-QN0002-REG	1.5-2			
HR-147Q-MW01	HR-147Q-MW01-SS-QN0003-REG	0-1			Metals and Explosives
	HR-147Q-MW01-DS-QN0004-REG	1-2			
HR-147Q-MW02	HR-147Q-MW02-SS-QN0005-REG	0-1			Metals and Explosives
	HR-147Q-MW02-DS-QN0006-REG	1.5-2			
HR-147Q-DEP01	HR-147Q-DEP01-DEP-QN0007-REG	0-1			Metals and Explosives
HR-147Q-DEP02	HR-147Q-DEP02-DEP-QN0008-REG	0-1	HR-147Q-DEP02-DEP-QN0009-FD		Metals and Explosives

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compounds.
VOC - Volatile organic compound.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: T. WINTON
PROJ. MGR.: J. YACOUB
DRAWN BY: D. BOMAR
STARTING DATE: 02/06/03
DATE LAST REV.:
DRAWN BY:
DWG. NO.: ...\796887es.657
PROJ. NO.: 796887
4/13/2004 4:44:00 PM
lstout
c:\cadd\Design\796887es.657

N

E 693,600

E 695,600

N. 1,177,400

N 1,175,900

PARCEL 144Q-X

PARCEL 147Q-X

PARCEL 97Q

FLOW

FIRING LINE

A

A'

HR-144Q-DEP01
HR-144Q-DEP02
HR-144Q-DEP03
HR-144Q-DEP04
HR-144Q-GP01
HR-144Q-GP02
HR-144Q-GP03
HR-144Q-GP04
HR-144Q-MW01
HR-147Q-DEP01
HR-147Q-DEP02
HR-147Q-GP01
HR-147Q-MW01
HR-147Q-MW02
HR-97Q-DEP01
HR-97Q-GP01
HR-97Q-GP02
HR-97Q-GP03
HR-97Q-GP04
HR-97Q-GP05
HR-97Q-GP06
HR-97Q-GP07
HR-97Q-GP08
HR-97Q-GP09
HR-97Q-MW01

1150 1125 1100 1075 1050 1025 1000 975 950 925 900 875 850 825 800 775

LEGEND

- UNIMPROVED ROADS
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- PARCEL BOUNDARY / AREA OF INVESTIGATION
- AREA OF ADDITIONAL INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE
- WOOD-FRAMED TARGET BOXES ON HILLSIDE
- MONITORING WELL/GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL/SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- CROSS SECTION LOCATION

APPROXIMATE LOCATION OF OBSERVED FEATURES

1. OBSERVATION TOWER
2. AIRFRAME MOCK-UP
3. WOOD-FRAMED FIRING/TARGET POSITIONS
4. DEPRESSIONS WITH AMMUNITION BOXES, 40mm FLARE AND POP FLARE EXPENDED
5. END-OF-RANGE SIGN
6. NUMEROUS 5.56mm BLANKS; POSSIBLE FIRING POSITION

SCALE
0 200 400 FEET

FIGURE 3-1
SAMPLE LOCATION MAP
FORMER RANGE 43, PARCEL 97Q; RANGE, CHOCCOLOCCO CORRIDOR; PARCEL 144Q-X; AND IMPACT AREA, CHOCCOLOCCO CORRIDOR, PARCEL 147Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

Shaw™ Shaw Environmental, Inc.

vegetation) from the immediate sample area. The soil sample was then collected with the sampling device and was screened with a photoionization detector (PID) in accordance with procedures outlined in the SAP. As necessary, the soil fraction for volatile organic compound (VOC) analysis was collected directly from the sample device using three EnCore® samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 18 soil borings at Parcels 97Q, 144Q-X, and 147Q-X, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and analytical parameters are listed in Table 3-2. Soil boring locations were determined in the field by the on-site geologist based on UXO avoidance activities, sampling rationale, presence of surface structures, and site topography.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than one foot below ground surface (bgs) in the unsaturated zone. The soil borings were advanced and soil samples collected using a stainless-steel hand auger, following procedures specified in the SAP. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Subsurface soil samples were collected continuously to 4 feet bgs or until hand-auger refusal was encountered. Samples were field screened using a PID to measure volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest sample interval was submitted for analysis. As necessary, the soil fraction for VOC analysis was collected directly from the sample device using three EnCore samplers. The remaining soil was then transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for each soil boring. The boring logs are included in Appendix B.

3.2.3 Monitoring Well Installation

Three permanent monitoring wells were installed at Parcels 97Q, 144Q-X, and 147Q-X to collect groundwater samples for laboratory analysis. However, two of the wells (HR-144Q-MW01 and

HR-147Q-MW01) did not produce sufficient water for sampling. The well locations are shown on Figure 3-1. Table 3-3 summarizes construction details of the monitoring wells installed at the site. The well construction logs are included in Appendix B.

Shaw contracted Miller Drilling Company to install the permanent wells using either a hollow-stem auger rig (HR-144Q-MW01 and HR-147Q-MW02) or an air-rotary drill rig (HR-147Q-MW01). The wells were installed following procedures outlined in the SAP. The boreholes at monitoring well locations HR-144Q-MW01 and HR-147Q-MW02 were advanced with a 4¼-inch inside diameter (ID) hollow-stem auger from ground surface to the first groundwater-bearing zone in residuum or to auger refusal. The borehole at well location HR-147Q-MW01 was advanced with a 7⅞-inch tri-cone roller bit equipped with 20-foot-long, 4¼-inch ID drill rods. Beginning at the completion depth of the hand-auger boring, a 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. The samples were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geological and hydrogeological information. Soil characteristics were described using the "Burmeister Identification System" described in Hunt (1986) and the Unified Soil Classification System as outlined in American Society for Testing and Materials (ASTM) Method D 2488 (ASTM, 2000). The boring logs are included in Appendix B.

Upon reaching the target depth in each borehole, a 10- to 20-foot length of 2-inch ID, 0.010-inch continuous slot, Schedule 40 polyvinyl chloride (PVC) screen with a PVC end cap was placed through the auger (or open borehole) to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of Number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 5 feet above the top of the well screen. At well location HR-147Q-MW01, the filter pack also included a 5-foot layer of extra fine filter sand (sieve size 30 to 70). A bentonite seal, consisting of approximately 5 feet of bentonite pellets, was placed immediately on top of the filter pack and hydrated with potable water. The bentonite seal placement and hydration followed procedures in the SAP. Bentonite-cement grout was tremied into the remaining annular space of the well from the top of the bentonite seal to ground surface. A well cap was placed on the PVC well riser. A locking protective steel casing was placed over the PVC well riser, and a concrete pad was constructed around the wellhead.

Table 3-3

Monitoring Well Construction Summary
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Well Location	Northing	Easting	Ground Elevation (ft amsl)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
HR-144Q-MW01	1176954.76	694526.81	901.94	903.99	30	10	20 - 30	2" ID Sch. 40 PVC
HR-147Q-MW01[a]	1176629.79	694898.90	840.87	842.95	65	20	45 - 65	2" ID Sch. 40 PVC
HR-147Q-MW02	1176867.77	695365.66	801.93	804.02	46	20	25.7 - 45.7	2" ID Sch. 40 PVC

Permanent wells installed using hollow-stem auger, except where noted.
[a] Well installed using air-rotary drilling methods.

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
Elevations referenced to the North American Vertical Datum of 1988.

2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
amsl - Above mean sea level.
bgs - Below ground surface.
ft - Feet

Monitoring well HR-147Q-MW02 was developed by surging and pumping with a submersible pump in accordance with methodology outlined in the SAP. The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well to re-establish the natural hydraulic flow conditions. Development continued for 8 hours or until the well was pumped dry and allowed to recharge three successive times. Attempts were made to develop the remaining wells using a polyethylene bailer, however, these wells did not produce enough water. The well development logs are included in Appendix C.

3.2.4 Water Level Measurements

The depth to groundwater was measured in permanent wells at the site and in wells at adjacent parcels on October 18, 2002, following procedures outlined in the SAP. Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned before use at each well following decontamination methodology presented in the SAP. Measurements were referenced to the top of the PVC well casing, as summarized in Table 3-4.

3.2.5 Groundwater Sampling

One groundwater sample (from monitoring well HR-147Q-MW02) was collected at Parcel 147Q-X. Monitoring wells HR-144Q-MW01 and HR-147Q-MW01 were not sampled because they were dry. The well/groundwater sample locations are shown on Figure 3-1. The groundwater sampling location and rationale are listed in Table 3-1. The groundwater sample designation and analytical parameters are listed in Table 3-5.

Sample Collection. The groundwater sample was collected using a bladder pump equipped with Teflon™ tubing, following procedures outlined in the SAP. Groundwater was sampled after purging a minimum of three well volumes and after field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Field parameters were measured using a calibrated water-quality meter. Field parameter readings are summarized in Table 3-6. Sample collection logs are included in Appendix A. The sample was analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.4.

3.3 Surveying of Sample Locations

Sample locations were surveyed using global positioning system and conventional civil survey techniques described in the SAP. Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were

Table 3-4

Groundwater Elevations
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; Impact Area, Parcel 147Q-X; and Vicinity
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
HR-144Q-MW01	18-Oct-02	NA	903.99	901.94	NA
HR-147Q-MW01	18-Oct-02	67.25	842.95	840.87	775.70
HR-147Q-MW02	18-Oct-02	29.36	804.02	801.93	774.66
Wells at Adjacent Parcels					
HR-94Q-MW01	18-Oct-02	23.48	904.66	904.73	881.18
HR-94Q-MW02	18-Oct-02	16.37	793.11	791.11	776.74
HR-95Q-MW01	18-Oct-02	29.45	840.20	838.16	810.75
HR-95Q-MW02	18-Oct-02	14.49	815.27	813.20	800.78
HR-95Q-MW03	18-Oct-02	19.91	785.74	783.86	765.83
HR-96Q-MW01	18-Oct-02	29.73	837.07	834.96	807.34
HR-131Q-MW01	18-Oct-02	53.62	770.92	768.90	717.30
HR-143Q-MW01	18-Oct-02	35.69	827.98	825.98	792.29
HR-143Q-MW02	18-Oct-02	28.02	827.22	825.14	799.20
HR-145Q-MW01	18-Oct-02	21.70	814.49	812.44	792.79
HR-145Q-MW02	18-Oct-02	10.96	764.11	761.98	753.15
HR-146Q-MW01	18-Oct-02	11.49	826.46	826.20	814.97
HR-146Q-MW02	18-Oct-02	23.69	828.17	825.86	804.48
HR-148Q-MW01	18-Oct-02	24.70	830.94	828.88	806.24

Elevations referenced to the North American Vertical Datum of 1988.

amsl - Above mean sea level.
BTOC - Below top of casing.
ft - Feet.
NA - Not available; well was dry.

Table 3-5

Groundwater Sample Designation and Analytical Parameters
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples[a]		Analytical Parameters
		Field Duplicates	MS/MSD	
HR-147Q-MW02	HR-147Q-MW02-GW-QN3002-REG			Metals and Explosives

[a] No QA/QC samples specified for this location in the SFSP.

FD - Field duplicate.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.

Table 3-6

Groundwater Field Parameters
Former Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Date	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
HR-147Q-MW02	23-Aug-02	0.028	3.58	170	23.78	123	5.49

Note: Groundwater samples were not collected at HR-144Q-MW01 and HR-147Q-MW01 because the wells were dry.

°C - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.

referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix D.

3.4 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters based on potential site-specific chemicals and on EPA, ADEM, FTMC, and USACE requirements. Samples collected at Parcels 97Q, 144Q-X, and 147Q-X were analyzed for the following parameters using EPA SW-846 methods, including Update III methods where applicable:

- Target analyte list metals – EPA Methods 6010B/7470A/7471A
- Nitroaromatic/nitramine explosives – EPA Method 8330.

A minimum of 10 percent of the samples were analyzed for the following additional parameters:

- Target compound list (TCL) VOCs – EPA Method 8260B
- TCL semivolatile organic compounds (SVOC) – EPA Method 8270C
- Chlorinated herbicides – EPA Method 8151A
- Chlorinated pesticides – EPA Method 8081A
- Organophosphorous pesticides – EPA Method 8141A.

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in the SAP. Sample documentation and chain-of-custody records were completed as specified in the SAP.

Completed analysis request and chain-of-custody records (Appendix A) were included with each shipment of sample coolers to EMAX Laboratories, Inc. in Torrance, California.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in the SAP. The IDW generated during the SI at Parcels 97Q, 144Q-X, and 147Q-X was segregated as follows:

- Drill cuttings
- Purge water from well development, sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment.

Solid IDW was staged on site in lined roll-off bins prior to waste characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, spent well materials, and personal protective equipment generated during the SI were disposed as nonhazardous waste at the Three Corners Landfill located in Piedmont, Alabama.

Liquid IDW was staged on site pending the results of waste characterization. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonhazardous waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

Four variances to the SFSP were recorded during completion of the SI at Parcels 97Q, 144Q-X, and 147Q-X. The variances did not alter the intent of the investigation or the sampling rationale presented in the SFSP. The variances are summarized in Table 3-7, and the variance reports are included in Appendix E.

No nonconformances to the SFSP were recorded during completion of the SI at Parcels 97Q, 144Q-X, and 147Q-X.

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix F. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan, the FTMC SAP and quality assurance plan, and standard, accepted methods and procedures. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 2001b) and the stipulated requirements for the generation of definitive data presented in the SAP. Chemical data were reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms.

Data Validation. The reported analytical data were validated in accordance with EPA National Functional Guidelines by Level III criteria. The data validation results are summarized by parcel in quality assurance reports, which include the data validation summary reports (Appendix G). Selected results were qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the reports. The validation-assigned qualifiers were added to the FTMC ShawView™ database for tracking and reporting. The qualified data were used in comparisons to the SSSLs and ESVs. Rejected data

Table 3-7

Variances to the Site-Specific Field Sampling Plan
Former Range 43, Parcel 97Q; Range, Parcel 144Q-X; and Impact Area, Parcel 147Q-X
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Residuum monitoring well HR-147Q-MW01 was installed using air-rotary drilling.	During hollow-stem auger drilling, auger refusal was encountered at depths ranging from 3 to 6 feet bgs. Therefore, a decision was made to install the monitoring well using air-rotary drilling techniques.	None. Groundwater was encountered at 45 feet bgs during air-rotary drilling and the well was successfully installed at 65 feet bgs.
Residuum monitoring well HR-97Q-MW01 was not installed and a groundwater sample was not collected.	During drilling at proposed residuum well location HR-97Q-MW01, groundwater was not present after drilling to 100 feet bgs. A decision was made by the FTMC BRAC Cleanup Team to discontinue drilling because the presence of lead contamination at that depth would be extremely minimal or nonexistent.	Minimal. The variance to the SFSP did not alter the intent of the SI at Parcel 97Q.
A groundwater sample was not collected from residuum monitoring well HR-144Q-MW01.	Groundwater in the well is of insufficient volume to collect a sample.	Minimal, this well is currently being monitored for the presence of groundwater. If the well contains a sufficient volume, a groundwater sample will be collected.
A groundwater sample was not collected from residuum monitoring well HR-147Q-MW01.	Groundwater in the well is of insufficient volume to collect a sample.	Minimal, this well is currently being monitored for the presence of groundwater. If the well contains a sufficient volume, a groundwater sample will be collected.

BRAC - Base Realignment and Closure.
FTMC - Fort McClellan.
SFSP - Site-specific field sampling plan.
bgs - Below ground surface.
SI - Site investigation.

(assigned an "R" qualifier) were not used in the comparisons to the SSSLs and ESVs. The data presented in this report, except where qualified, meet the principle data quality objective for this SI.